

REMARKS

Applicants request favorable reconsideration of this application in view of the foregoing amendments and the following remarks. Of claims 1-5 that were pending in the application, claims 1-3 and 5 were rejected in the Office Action. Applicants appreciate the indication of allowable subject matter in claim 4.

By way of this Amendment, Applicants have cancelled claims 1-5, without prejudice or disclaimer. Without adding new matter, Applicants have added new claims 6-29, which are respectfully presented for consideration. Further, new claim 14 substantially recites the subject matter of original claim 4, which, as previously mentioned, the Examiner indicated contained allowable subject matter.

1. Information Disclosure Statement

Applicants respectfully request that the next paper issued by the Patent Office include an Examiner-initialed copy of the form PTO/SB/08, which was submitted along with the Information Disclosure Statement filed on June 4, 2004.

2. Objections to the Specification

The Examiner objected to the specification for various formalistic reasons, each of which has been fully obviated by the amendments made herein to the specification. With respect to the Examiner's question regarding use of the term "worm", the usage is proper, *i.e.*, the term refers to a spirally threaded gear that is commonly known as a "worm gear". Accordingly, as the grounds for the objection are now moot, a withdrawal of the objection is both warranted and earnestly solicited.

3. Rejection of Claim 1: 35 U.S.C. § 112, ¶ 2

The Examiner rejected claim 1 under 35 U.S.C. § 112, ¶ 2 as allegedly being "indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Applicants respectfully submit that this rejection is now moot due to the cancellation of claim 1, without prejudice or disclaimer. In addition, however, Applicants respectfully note that the Examiner's comments were addressed when drafting new claim 14, which substantially recites the subject matter of original claim 4, which was dependent on claim 1 and which the Examiner indicated contained allowable subject matter.

4. Rejections of Claims 1-3 and 5: 35 U.S.C. §§ 102(b), 103(a)

The Examiner rejected: (a) claims 1 and 2 under 35 U.S.C. § 102(b) as allegedly being anticipated by U.S. Patent No. 6,288,508 (“Taketomi”); and (b) claims 3 and 5 under 35 U.S.C. § 103(a) as allegedly being obvious when considering Taketomi in view of U.S. Patent No. 6,124,688 (“Coles”). As claims 1-3 and 5 have been cancelled, without prejudice or disclaimer, each of these rejections is now moot and, therefore, should be withdrawn.

5. New Claims 6-29**A. New Claims 6-13**

New independent claim 6 (*i.e.*, the claim from which claims 7-13 depend) recites a driving control device for an actuator that includes, among other possible things (*italic emphasis added*):

- a drive circuit configured to drive an electric motor of an actuator for opening and closing *an air conditioning door*; and
- a drive control circuit configured to control a rotation of said electric motor by controlling the drive circuit,
- wherein said drive circuit includes an H bridge circuit having a switching semiconductor element,
- wherein said drive circuit is configured to rotate said electric motor in forward and reverse directions by turning on and/or off said switching semiconductor element,
- wherein said drive control circuit is configured to start and/or stop said electric motor by applying a PWM signal to the switching semiconductor element constructing a lower arm of said H bridge circuit.

Neither Taketomi’s braking device nor Coles’ power steering device teaches or suggests an “air conditioning door”, as recited in claim 6. Accordingly, Taketomi and Coles, standing alone or combined, can not be used to reject claim 6, or any claim dependent thereon, under 35 U.S.C. §§ 102(b), or 103(a). Moreover, as claims 7-13 depend from claim 6, each of these dependent claims is also allowable over Taketomi and Coles, without regard to the other patentable limitations recited therein. Accordingly, claims 6-13 are allowable over Taketomi and Coles.

B. Claims 14-21

New independent claim 14 (*i.e.*, the claim from which claims 15-21 depend) recites a driving control device for an actuator that includes, among other possible things (*italic emphasis added*):

- a drive circuit configured to drive an electric motor of an actuator; and
- a drive control circuit configured to control a rotation of said electric motor by controlling the drive circuit,

wherein said drive circuit includes an H bridge circuit having a switching semiconductor element,

wherein said drive circuit is configured to rotate said electric motor in forward and reverse directions by turning on and/or off said switching semiconductor element,

wherein said drive control circuit is configured to start and/or stop said electric motor by applying a PWM signal to the switching semiconductor element constructing a lower arm of said H bridge circuit, and

wherein said drive control circuit is configured to apply a driving pulse when a radio is turned on and is configured to apply the PWM signal when said radio is turned off.

As acknowledged by the Examiner's indication that claim 4 contained allowable subject matter, neither Taketomi nor Coles teaches or suggests a drive control unit that "is configured to apply a driving pulse when a radio is turned on and is configured to apply the PWM signal when said radio is turned off", as recited in claim 14. Accordingly, Taketomi and Coles, standing alone or combined, can not be used to reject claim 14, or any claim dependent thereon, under 35 U.S.C. §§ 102(b), or 103(a). Moreover, as claims 15-21 depend from claim 14, each of these dependent claims is also allowable over Taketomi and Coles, without regard to the other patentable limitations recited therein. Accordingly, claims 14-21 are allowable over Taketomi and Coles.

C. Claims 22-29

New independent claim 22 (*i.e.*, the claim from which claims 23-29 depend) recites a driving control device for an actuator that includes, among other possible things (*italic emphasis added*):

a drive circuit configured to drive an electric motor of an actuator;
and

a drive control circuit configured to control a rotation of said electric motor by controlling the drive circuit,

wherein said drive circuit includes an H bridge circuit having a switching semiconductor element,

wherein said drive circuit is configured to rotate said electric motor in forward and reverse directions by turning on and/or off said switching semiconductor element,

wherein said drive control circuit is configured to start and/or stop said electric motor by applying a PWM signal to the switching semiconductor element constructing a lower arm of said H bridge circuit, and

wherein a duty ratio of the PWM signal varies based on a predetermined rate from a first value to a second value.

Although Taketomi teaches, in step 3.3 of Figure 4 (col. 4, lines 35-44), "gradually" increasing magnetic field current, Taketomi fails to teach or suggest varying a duty ratio of a PWM signal based on a predetermined rate. As a result, Taketomi fails to teach or suggest

the above-italicized limitation of claim 22. Moreover, although Coles teaches: (a) using complementary modulation at low current (during which time the lower half of the bridge is used); and (b) varying the modulation at high current (during which time both halves of the bridge are used), Coles fails to teach or suggest varying the PWM duty ratio according to a predetermined rate. See Coles at col. 7, line 14 – col. 9, line 11. In contrast to Taketomi and Coles, in one embodiment of the present invention, the duty ratio of the PWM signal changes at a predetermined rate of, e.g., 8% per second. See p. 9, line 24 – p. 10, line 22; p. 11, lines 20-25.

As Coles and Taketomi, standing alone and combined, fail to teach or suggest each of the limitations of claim 22, the references can not be used to reject claim 22, or any claim dependent thereon, under 35 U.S.C. §§ 102(b), or 103(a). Moreover, as claims 23-29 depend from claim 22, each of these dependent claims is also allowable over Taketomi and Coles, without regard to the other patentable limitations recited therein. Accordingly, claims 22-29 are allowable over Taketomi and Coles.

CONCLUSION

For the aforementioned reasons, claims 6-29 are now in condition for allowance. A Notice of Allowance at an early date is respectfully requested. The Examiner is invited to contact the undersigned if such communication would expedite the prosecution of the application.

Respectfully submitted,

Date April 4, 2005

By 

Customer Number: 22428
FOLEY & LARDNER LLP
3000 K Street, N.W.
Suite 500
Washington, D.C. 20007-5143
Telephone: (202) 672-5300
Facsimile: (202) 672-5399

Pavan K. Agarwal
Registration No. 40,888

Frederic T. Tenney
Registration No. 47,131

Attorneys for Applicants

THE COMMISSIONER IS HEREBY AUTHORIZED TO CHARGE ANY ADDITIONAL FEES WHICH MAY BE REQUIRED REGARDING THIS APPLICATION UNDER 37 C.F.R. §§ 1.16-1.17, OR CREDIT ANY OVERPAYMENT, TO DEPOSIT ACCOUNT NO. 19-0741. SHOULD NO PROPER PAYMENT BE ENCLOSED HERewith, AS BY A CHECK BEING IN THE WRONG AMOUNT, UNSIGNED, POST-DATED, OTHERWISE IMPROPER OR INFORMAL OR EVEN ENTIRELY MISSING, THE COMMISSIONER IS AUTHORIZED TO CHARGE THE UNPAID AMOUNT TO DEPOSIT ACCOUNT NO. 19-0741. IF ANY EXTENSIONS OF TIME ARE NEEDED FOR TIMELY ACCEPTANCE OF PAPERS SUBMITTED HERewith, APPLICANT HEREBY PETITIONS FOR SUCH EXTENSION UNDER 37 C.F.R. § 1.136 AND AUTHORIZES PAYMENT OF ANY SUCH EXTENSIONS FEES TO DEPOSIT ACCOUNT NO. 19-0741.

AMENDMENTS TO THE DRAWINGS

Figure 2 has been amended to replace numeral “15” (which is the reference numeral for the defrost blower – p. 5, line 22) has been replaced with “30A” (which is the reference numeral for the electric motor type actuator – p. 5, line 16).

Figure 6 has been amended to include a “Prior Art” label, as the figure details a circuit diagram of a conventional H bridge circuit.